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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional)
P.19470/MAJR

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Application Number	Filed
10/069,944	September 19, 2002

First Named Inventor: David William Dew

Art Unit	Examiner
1742	Wilkins, Harry D.

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).
Note: No more than five (5) pages may be provided.

I am the

- [ ] applicant/inventor.
- [ ] assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)
- [X] attorney or agent of record. Registration number 47003
- [ ] attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

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11/21/2006
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

[X] *Total of 1 forms are submitted.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: DEW, et al.

Application No.: 10/069,944 Group Art Unit: 1742

Filed: 09/19/2002 Examiner: Wilkins III, Harry D.

For: BIOLEACHING OF SULPHIDE MINERALS

REASONS FOR PRE-APPEAL BRIEF REQUEST FOR REVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is filed in response to the Final Office Action bearing a mail date of July 21, 2006, and is being submitted as part of a Pre-Appeal Brief Request for Review.

Claims 36 and 38-55 are pending in the present application.

Independent claims 36 and 54 are discussed in detail in applicant's responses dated December 13, 2005 and May 31, 2006, reconsideration of which is solicited:

Again reviewing claim 36 and 54:

36. A method of bioleaching a slurry containing sulphide minerals which includes the steps of subjecting the slurry in a reactor to a bioleaching process at a temperature in excess of 45 °C, supplying a feed gas which contains in excess of 85% oxygen by volume to the slurry, and controlling a dissolved oxygen concentration in the slurry at a level in a range of from 0.2×10^{-3} kg/m^3 to 10×10^{-3} kg/m^3 by controlling at least one of the following: the oxygen content of the feed gas, the supply of feed gas to the slurry; the rate of feed of slurry to the reactor.

54. A bioleaching plant which includes a reactor vessel, a source which feeds a sulphide mineral slurry to the vessel wherein a bioleaching process is carried out at a temperature in

excess of 45°C, an oxygen source which supplies oxygen in the form of substantially pure oxygen to the slurry, a device which measures the dissolved oxygen concentration in the slurry in the vessel, and a control mechanism whereby, in response to the said measured dissolved oxygen concentration, the supply of oxygen from the oxygen source to the slurry is controlled to achieve a dissolved oxygen concentration in the slurry of from 0.2×10^{-3} kg/m^3 to 10×10^{-3} kg/m^3.

Claims 36 and 38-55 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Emmett, Jr. (U.S. Patent 5,007,620) in view of Brierley (U.S. Patent 5,332,559), McWhirter (U.S. Patent 6,299,776), Eppstein (U.S. Patent 4,680,267) and Vahldieck (U.S. Patent 3,926,794). Applicant submits the following reasons for overcoming this rejection.

As previously stated by the Applicants, the present invention is directed to the unexpected discovery of oxygen concentrations in excess of 85% oxygen by volume for C* (oxygen concentration in the gas phase) and oxygen concentrations in the range of 0.2×10^{-3} kg/m^3 to 10×10^{-3} kg/m^3 for C_L (oxygen concentration in the liquid phase) and using these value parameters in a method for bio-leaching at temperatures that exceed 45°C (see page 10 of Applicant's Response dated Dec. 13, 20055, lines 12-15). All three of these values are required elements of the present invention.

The Examiner asserts that the Emmett reference is directed to a method of bioleaching a metal from a metal bearing sulfide mineral slurry. However, the Examiner recognizes the shortcomings in Emmett in that it does not teach or suggest the following:

1) using thermophilic bacteria for temperatures over 45 °C;

2) the step of controlling the dissolved oxygen concentration in the slurry to a desired level by controlling at least one of the oxygen content of the feed gas, the supply of feed gas or the rate of feed of slurry; and

3) the feed gas containing oxygen contains at least 85% oxygen.

Applicant submits that the Examiner is merely selecting elements from a variety of prior art references directed to bioreactors to obtain the Applicant's claimed invention. Specifically, the Examiner is not permitted to merely "pick and choose among individual elements of assorted prior art references to recreate the claimed invention". SmithKline Diagnostics, Inc. v. Helena Laboratories Corp., 859 F.2d 878, 8 USPQ2d 1468 (Fed. Cir. 1988). Applicant submits that the Examiner is impermissibly looking at a single line in a reference taken out of context and relying on the benefit of hindsight to show obviousness. Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 796 F.2d 443, 230 USPQ 416 (Fed. Cir. 1986).

a. The present invention is directed to a balance being reached between the mass transfer rate of oxygen into the slurry and the uptake rate of oxygen by microorganisms in the slurry at a specified temperature.

Applicant submits that temperatures higher than 45 °C greatly increase the rate of bioleaching in the reactor. However, at temperatures exceeding 45 °C, a problem arises that the solubility of oxygen descreases significantly. This impacts on the availability of dissolved oxygen in the slurry and therefore is a principle factor limiting bio-leaching at these temperatures. The prior art recognizes a general difficulty in transferring a gas from the gas phase into the liquid (slurry) phase. (See Response dated Dec. 13, 2005, pages 8-9). The prior art fails to recognize that this difficulty is significantly greater at temperatures above 45 °C. Arbitrarily enriching air with oxygen, and introducing this to the reactor, may initially achieve the desired result in increasing the mass transfer rate. However, this may result in oxygen being provided to the slurry in excess of the microorganisms' requirement. (See Response dated Dec. 13, 2005, page 9). Additionally, enriching air with substantially pure oxygen is an expensive

undertaking. The cost associated with this step can only be financially justified if most of the oxygen, supplied as substantially pure oxygen, is utilized by the microorganisms in the slurry. Value parameters for C* and C_L need to be identified that result in a balance being reached between the mass transfer rate of oxygen into the slurry and the uptake rate of oxygen by microorganisms in the slurry. This balance was unexpectedly discovered by the Applicants using the parameters identified in the claimed invention. The results of an experiment carried out by Applicants (see Table 2 of the specification) support this contention.

The Brierley reference teaches the use of thermophiles which grow at temperatures in excess of 50 °C (page 22, lines 1-5). However, the Brierley reference does not teach or suggest supplying a feed gas containing in excess of 85% oxygen and controlling a dissolved oxygen concentration within a predetermined concentration range. The Brierley reference does not show any appreciation of the oxygen solubility problems that arise from these high temperatures. Applicant submits that the solubility of oxygen decreases significantly at these temperatures and bio-leaching at these temperatures is limited (see Response dated Dec. 13, 2005, page 8). Therefore, one of ordinary skill in the art would not be motivated to use the thermophilic microorganisms of Brierley because of the known oxygen solubility problems that would occur.

The McWhirter reference acknowledges that the availability of dissolved oxygen in the slurry determines the rate of bio-leaching, and teaches a method of improving this availability. McWhirter's method teaches increasing the mass transfer coefficient (M) by producing a droplet stream from the slurry using a surface aerator and by the indiscriminate addition of a gas containing between 21-99 % oxygen. No mention is made of the unique difficulties associated with making dissolved oxygen available to the microorganisms in the slurry above 45 °C without the need to increase M (see Response dated Dec. 13, 2005, page 11). Applicant has identified

the significant cost attached with increasing M, and has focused the present invention on the oxygen driving force to solve the problems discussed in the prior art. (see Response dated Dec. 13, 2005, page 9, lines 4-11)

b. The Vahldieck reference is directed to an organic sludge

Applicant submits that the Vahldieck reference teaches a method of digesting an organic sludge with the aid of microorganisms. Applicant submits that the microorganisms responsible for the oxidative digestion in Vahldieck are bacteria. It is further submitted that the heterotrophic bacteria, which require organic compounds for their supply of carbon and energy, predominate the teaching in Vahldieck. Applicant submits that heterotrophic bacteria is physiologically incapable of bio-leaching an inorganic substrate consisting of a sulphide mineral (See Response dated May 31, 2006, page 9). The problems encountered in an organic sludge bio-oxidation process and the solutions taught by Vahldieck cannot, without critical evaluation, be applied to an inorganic slurry bio-leaching process.

In view of the foregoing, the present application is now believed to be in condition for allowance. The Examiner is asked to consider entering this, withdrawing the final rejection and passing the application to allowance. Further and favorable consideration is requested.

Should the Examiner have any questions, he is requested to contact the undersigned.

Respectfully submitted,

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Dated: November 21, 2006

By: Jennifer P. Yancy
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Reg. 47,003